APPENDIX D: DENDROCHRONOLOGY PROCEDURES

Methods

Nineteen red alders on terrace surfaces at three study sites along the mainstem of Redwood Creek within Mount Tamalpais State Park were cored to date the terrace surfaces (Figure 9). By aging alders on terrace surfaces, a minimum age for the terrace feature can be estimated. Trees were selected from aerial photographs of the channel and from surveys conducted by Stillwater Sciences to quantify the volume of material stored in the terraces. Cores were taken with a two-thread, Haglof 5.15-mm diameter increment borer. The increment borer was sterilized after each use by dunking the corer into a 5-gallon bucket filled with a mixture of bleach and water to prevent the transmittal of disease from tree to tree. Additionally, a beeswax plug was inserted into the hole left by the increment corer to prevent the entry of any foreign vectors that could harm the tree. Although healthy trees should naturally fill the core hole with sap to prevent disease or insect attack, we used the beeswax plug as an added precaution.

Trees were selected that were dominant in their size class, and, where possible, numerous trees were cored on each terrace surface at the three study sites (Table D1). Alders were selected for coring because they have colonized terraces throughout the Redwood Creek watershed and selection of a single species eliminated variation between species in our analysis. Three coring sites were selected at the following locations:

- station 119 and 120, Upstream of the Franks Valley Bridge (considered one site);
- station 126, downstream of Kent Canyon; and
- station 130, in the Kent Canyon alluvial fan.

For each tree that was cored, the diameter at breast height (DBH), distance from the active channel, and the height of the terrace surface above the low flow water surface elevation were recorded. A sketch map was made of each site, which included cored trees and uncored trees on each terrace (see Figure D-1 for examples of sketch maps). The active channel and the terrace surfaces were also delineated on the sketch maps.

Trees rings were counted in the field and cores were saved in plastic sleeves. Cores were taken close to the ground surface, but above the butt swell of the tree. The root crown of the tree was identified to make sure that the tree had not been partially buried by sediment. When the core didn't intersect the pith of the tree, the number of rings to the center of the tree was estimated based on ring spacing. Recorded ages are estimated to be within 5 years of the actual age of the tree.

Results

Nineteen red alders were cored at the three study sites that ranged in DBH from 32 to 69 cm. A positive correlation was identified between DBH and tree age (Figure D-2), but the range of ages of cored trees was limited. No trees younger than 24 years old were cored and the oldest tree was estimated at 50 years old. Including younger trees in future analysis would increase the correlation between DBH and age. Tree ages did increase as the terrace surface elevation increased, but the difference in age classes between the different surfaces was far less than anticipated. Red alders were cored on terrace surfaces ranging from 0.6 to 1.8 m above the low flow water surface elevation. Results are summarized in Table D1.

Table D1. Summary of results from coring red alders at three study sites on Redwood Creek between Frank Valley Bridge and Muir Woods National Monument overflow parking lot (station 119 and 120 compose one study site).

Terrace Elevation Above the Low Flow Channel (m)	Station Number Closest to Cored Tree (NPS tags)	DBH (cm)	Average DBH for the Terrace (cm)	Age (years)	Average Age of Cored Trees for each Terrace Surface (years)
0.9	119	33.5	39.8	24	32
	119	38.0		26	
	126	41.5		38	
	130	55.0		32	
	126	69.0		41	
	120	32.0		31	
1.1	120	37.8	47.6	30	39
	120	40.5		29	
	120	45.5		33	
	126	57.0		46	
	126	67.0		50	
	130	38.0		46	
1.2	119	43.5	43.5	34	34
1.8	126	43.5	51.5	37	39
	119	46.8		43	
	130	49.5		32	
	126	54.5		48	
	120	59.0		42	
	119	55.5		33	

The relationship between DBH and age was not strong enough to apply a BDH relationship to alders along Redwood Creek. Although the data shows an increasing trend between age and terrace elevation, the age difference between trees on different terrace surfaces was less than the variability of tree ages within the same terrace. Results from this analysis could be improved by coring more trees of different age classes and DBH along the mainstem of Redwood Creek. However, radiocarbon dating samples from alluvial sediments in each terrace may be more effective, as the terraces could be older than the dendrochronology record.

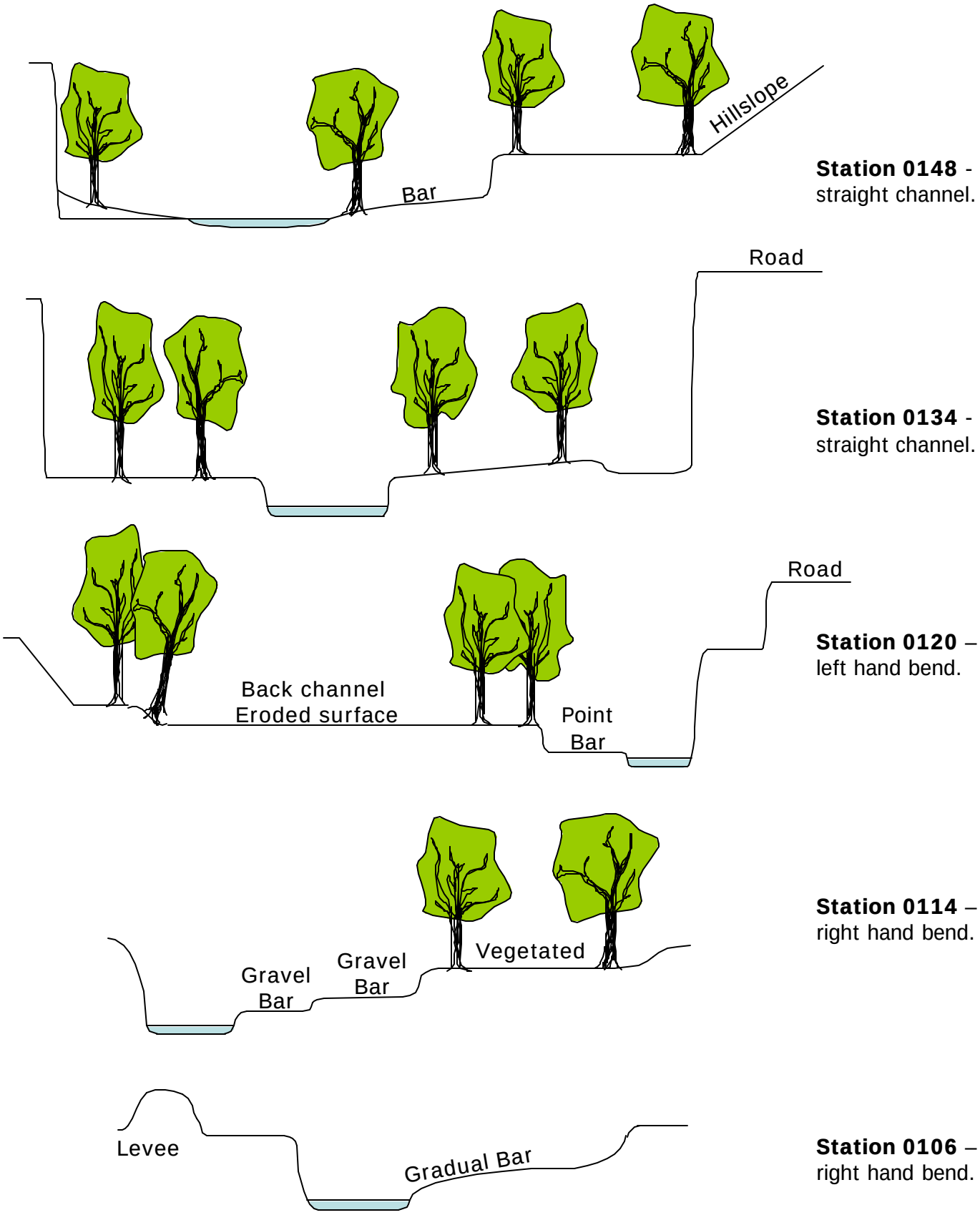

Figure D-1. Typical Redwood Creek dendrochronology station sketch maps showing cored and uncored trees, the active channel, and terrace surfaces.

(Approximate scale: horizontal = 7.0 m/in; vertical = 7.5 ft/in)

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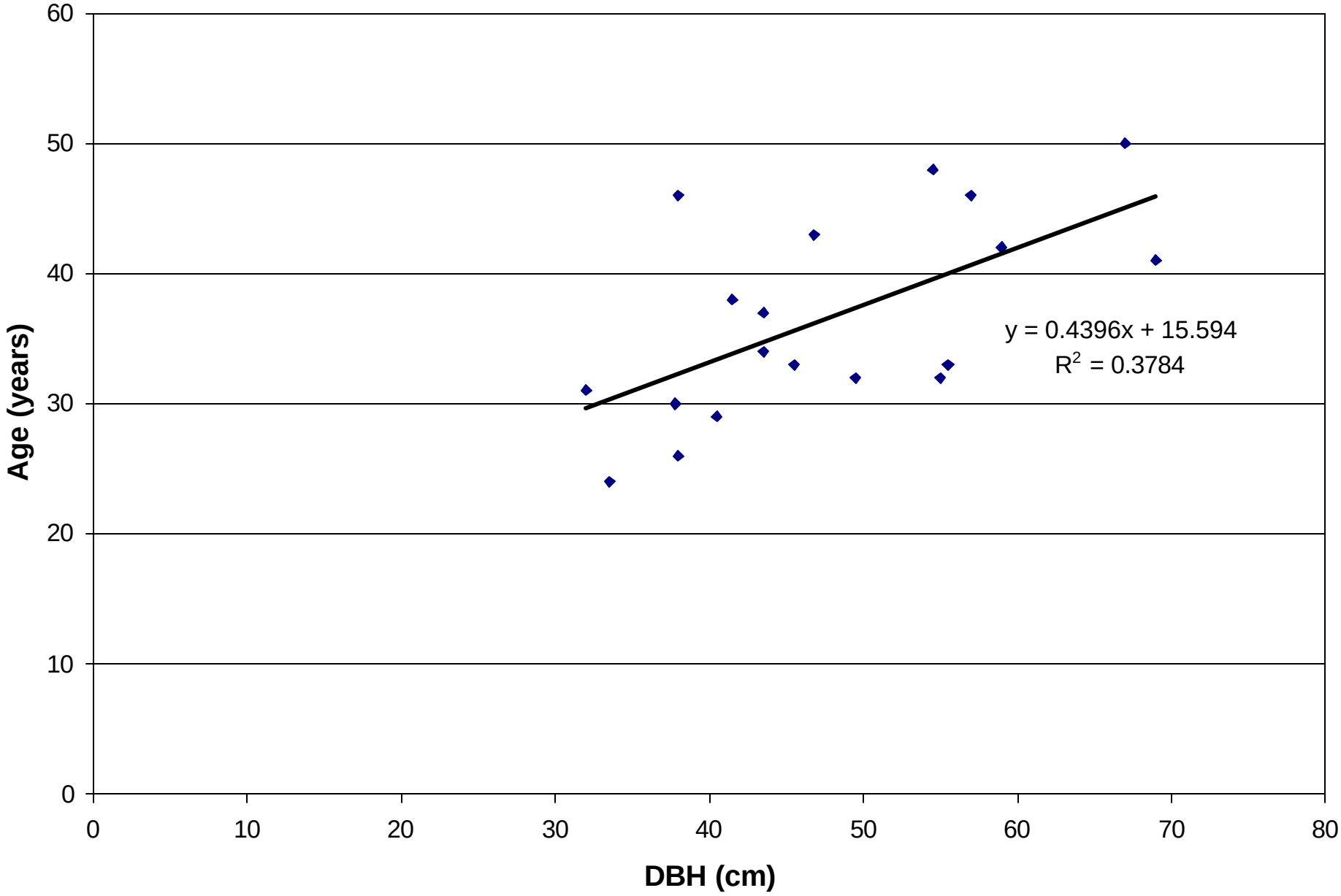

Figure D-2. Age and diameter at breast height (DBH) for alders cored along Redwood Creek, Marin Co., CA.

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